irregular-shaped geographic region. The use of an estimated geographic region which totally encompasses a corresponding geographic region and an estimated geographic zone which totally encompasses a corresponding geographic zone insures that the determination as to whether the estimated zone is located within the estimated geographic region is that the estimated zone is located within the estimated geographic region whenever the geographic zone is located within the geographic region. If an estimated geographic region does not totally encompass a corresponding geographic region, then the determination may be that the estimated zone is not located within the selected estimated region even though the geographic zone is located within the corresponding geographic region.

Flow Diagrams for the Preferred Methods for Identifying the Geographic Region which Contains a Geographic Point

Basic Method

The common overall method shared by the preferred methods of identifying the geographic region which contains a geographic zone, the Basic Method, is shown in FIG. **12**. The method begins at step **1200** with the receipt of a geographic zone. The method then proceeds to step **1202** where one of the geographic regions is selected as the selected region. In step **1204**, a determination is made as to whether the geographic zone is located within the selected region. If the geographic zone is located within the selected region, then the selected region is identified in step **1206** and the method ends at step **1208**. If the geographic zone is not located within the selected region in step **1204**, then another geographic region is selected. Geographic regions continue to be selected until the geographic region which contains the geographic zone is identified.

Selection of a Geographic Region as the Selected Region

As described in the Boundary Point Pair Method and the Single Boundary Point Method above, the step of selecting a geographic region as a selected region may include the additional step of dividing the geographic area into geographic regions as shown in FIG. **13**. The geographic area is divided into a plurality of geographic regions in step **1300** of FIG. **13**. Alternatively, as in the Boundary Point Pair Method Using Estimated Geographic Regions and the Single Boundary Point Method Using Estimated Geographic Regions, the geographic area may be divided into geographic regions before the method begins.

The Boundary Point Pair Method Using Estimated Geographic Regions and the Single Boundary Point Method Using Estimated Geographic Regions use estimated geographic regions FIG. **14** illustrates the step of selecting one of the geographic regions as a selected region when a preferred method using estimated geographic regions is used. In step **1400**, the geographic zone is estimated by an estimated zone. Then, in step **1402** one of the geographic regions is selected as the selected region. Once the selected region is selected then, in step **1404**, the selected region is estimated by a selected estimated region. Next, in step **1406** a determination is made as to whether the estimated zone is located within the selected estimated region. If the estimated zone is located within the selected estimated region, then the method proceeds to step **1204**. If the estimated zone is not located within the selected estimated region, then another geographic region is selected as the selected region in step **1402**, and steps **1404** and **1406** are repeated. Steps **1402**, **1404** and **1406** are repeated until the estimated zone is located within the selected estimated region.

Determination as to Whether a Geographic Zone is Located in the Selected Region

The step of making a determination as to whether the geographic zone is located within the selected region is common to all the preferred methods and is shown as step **1204** in FIG. **12**. The preferred methods provide different ways to make a determination as to whether the geographic zone is located within the selected region by using different steps for determining whether a selected zone boundary point in located within the selected region. The alternatives used by the different methods are shown in FIGS. **15**, **16** and **17**.

FIG. **15** illustrates step **1204** as described in the Boundary Point Pair Method and the Boundary Point Pair Method Using Estimated Geographic Regions. In step **1500** of FIG. **15**, one of the zone boundary points is selected as a selected zone boundary point. Then, in step **1502** a straight line of predetermined slope is drawn through the selected zone boundary point. A determination is made as to whether the line of predetermined slope intersects the boundary of the selected region in step **1504**. If the line does not intersect the boundary of the selected region, then another geographic region is selected as the selected region in step **1202**. Geographic regions continue to be selected as the selected region until the line intersects the boundary of the selected region. If the line intersects the boundary of the selected region, then the method proceeds to step **1506**. In step **1506**, a determination is made as to whether the selected zone boundary point lies on the line between the first boundary point and the second boundary point. If the selected zone boundary point lies on the line between the first boundary point and the second boundary point, then the selected zone boundary point is located within the selected region. If the selected zone boundary point does not lie on the line between the first boundary point and the second boundary point, then steps **1202**, **1500**, **1502**, **1504** and **1506** are repeated until the selected zone boundary point is located within the selected region. If the selected zone boundary point lies on the line between the first boundary point and the second boundary point, then a determination is made as to whether all the zone boundary points have been selected as a selected zone boundary point in step **1508**. If all the zone boundary points have been selected as a selected zone boundary point, then the method proceeds to step **1206**. If all the zone boundary points have not been selected as a selected zone boundary point, then steps **1500**, **1502**, **1504**, **1506** and **1508** are repeated.

Another alternative for step **1204** is shown in FIG. **16** and is described by the Single Boundary Point Method and the Single Boundary Point Method Using Estimated Geographic Regions. Beginning at step **1500**, one of the zone boundary points is selected as a selected zone boundary point. Then, in step **1502** a line of predetermined slope is drawn through the selected zone boundary point. A determination is made as to whether the line of predetermined slope intersects the boundary of the selected region in step **1502**. If the line does not intersect the boundary of the selected region, then another geographic region is selected. Steps **1202**, **1500**, **1502** and **1504** are repeated until the line intersects the boundary of the selected region. If the line intersects the boundary of the selected region, then in step **1600** a determination is made as to whether the line intersects the boundary of the selected region at the selected zone boundary point. If the line intersects the boundary of the selected region at the selected zone boundary point, the selected zone boundary point is located within the geographic region. If the line does not intersect the boundary of the selected region at the selected zone boundary point, the selected zone boundary point is not located within the selected region and steps **1202**, **1500** **1502**, **1504** and **1600** are repeated until the selected zone boundary point is located within the selected